SUPPLEMENTAL MATERIALS

Supplementary Table I: **Unadjusted OR by age group for all variables**

	Age < 50				Age ≥ 50			
		95% CI OR				95% CI OR		
Variable	OR	Lower	Upper	*p*-value	OR	Lower	Upper	*p*-value
Income, %	1.679	1.281	2.199	<0.000	1.758	1.512	2.045	<0.000
Education, %	1.393	0.857	2.263	0.181	1.352	1.105	1.653	0.003
Hypertension, %	26.636	14.590	48.629	<0.000	17.933	12.416	25.903	<0.000
Dyslipidemia, %	2.646	1.989	3.520	<0.000	2.215	1.881	2.608	<0.000
Diabetes, %	7.235	4.357	12.015	<0.000	3.757	3.134	4.503	<0.000
Cardiac Disease, %	3.333	1.872	5.936	<0.000	2.333	1.790	3.042	<0.000
HDL 2, %	1.317	0.988	1.755	0.060	1.731	1.464	2.047	<0.000
LDL 2, %	1.292	0.980	1.704	0.069	0.997	0.856	1.161	0.969
LDL/HDL 2, %	1.155	0.880	1.515	0.300	1.396	1.193	1.633	<0.000
LDL/HDL 3:								
(1) <= 2.00, %				0.542				<0.000
(2) 2.01 - 2.96, %	1.065	0.776	1.461	0.697	1.341	1.107	1.624	0.003
(3) 2.97+, %	1.193	0.868	1.640	0.277	1.623	1.347	1.956	<0.000
Total Cholesterol 2, %	1.466	1.118	1.922	0.006	1.086	0.932	1.266	0.292
Triglyceride 2, %	3.750	2.539	5.538	<0.000	1.895	1.576	2.280	<0.000
Waist-to-hip Ratio 1	3.796	2.771	5.200	<0.000	1.607	1.336	1.932	<0.000
Waist-to-hip Ratio 2:								
(1) <= .90, %				<0.000				<0.000
(2) .91 - .96, %	2.907	2.103	4.019	<0.000	1.571	1.309	1.885	<0.000
(3) .97+, %	4.446	3.016	6.555	<0.000	1.673	1.386	2.019	<0.000
Waist-to-hip Ratio 3, %	4.778	2.875	7.941	<0.000	1.640	1.295	2.076	<0.000
Waist-to-hip Ratio 4, %	3.414	2.548	4.574	<0.000	1.618	1.376	1.901	<0.000
BMI 1	0.994	0.967	1.021	0.643	1.008	0.992	1.025	0.326
BMI 2, %	0.968	0.679	1.380	0.856	0.921	0.751	1.131	0.434
Physical Activity, %	0.250	0.084	0.748	0.013	0.526	0.359	0.772	0.001
Tobacco 1, %	5.000	1.914	13.061	0.001	2.000	1.169	3.421	0.011
Tobacco 2, %	2.857	1.555	5.251	0.001	1.136	0.887	1.454	0.314
Alcohol 1, %	1.882	1.340	2.644	<0.000	1.189	0.966	1.463	0.102
Alcohol 2, %	1.500	1.109	2.030	0.009	1.233	1.040	1.462	0.016
Alcohol 3:								
(1) Never Use, %				0.007				0.002
(2) Ever Low Use, %	1.513	1.007	2.274	0.046	1.290	0.992	1.679	0.057
(3) Ever High Use, %	13.926	1.816	106.805	0.011	4.412	1.790	10.873	0.001
Stress, %	1.450	1.044	2.015	0.027	1.921	1.566	2.357	<0.000
Cancer, %	1.000	0.063	15.988	1.000	3.333	0.917	12.112	0.067
Depression, %	1.107	0.664	1.846	0.696	1.299	0.982	1.718	0.067
CVD 1, %	1.462	1.119	1.908	0.005	1.948	1.652	2.298	<0.000
Salt, %	1.176	0.745	1.858	0.486	1.706	1.265	2.301	<0.000
Green veg, %	0.436	0.306	0.621	<0.000	0.508	0.420	0.615	<0.000
Whole grains, %	1.077	0.738	1.571	0.700	1.317	1.075	1.614	0.008
Legumes, %	1.186	0.890	1.580	0.244	1.094	0.932	1.283	0.272
Fruit, %	0.507	0.338	0.762	0.001	0.792	0.642	0.977	0.029

Sugar, %	0.877	0.671	1.147	0.339	0.795	0.678	0.932	0.005
Meat, %	1.293	0.860	1.943	0.217	1.358	1.125	1.641	0.001
Fish, %	1.160	0.679	1.980	0.587	1.081	0.807	1.450	0.601

Supplementary Table II: Association of Hypertension with Stroke among West Africans under 50 years.

Definition of hypertension	Frequency (%) of hypertension BP ≥ 140/90mmHg	Adjusted OR (95% CI)	P-value
Using different definitions of hypertension in cases with application of correction factor to Systolic BP after stroke based on OXVASC study[1]			
Self-reported history of Hypertension, or use of antihypertensive medications before stroke, corrected mean of BP at admission and morning after	386/511 (75.5%)	8.57 (4.52 – 16.26)	<0.0001
Self-reported history of Hypertension, or use of antihypertensive medications before stroke, corrected mean of BP at admission	386/511 (75.5%)	10.18 (5.15 – 20.12)	<0.0001
Self-reported history of Hypertension, or use of antihypertensive medications before stroke, corrected mean of BP after admission	388/509 (76.2%)	8.90 (4.69 – 16.90)	<0.0001
Self-reported history of Hypertension, or use of antihypertensive medications before or after stroke, corrected mean of BP at admission	450/511 (88.1%)	36.70 (12.98-103.76)	<0.0001
Using different definitions of hypertension in cases <u>without application of correction factors</u> to Systolic BP after stroke based on OXVASC Study[1]			
Self-reported history of Hypertension, or use of antihypertensive medications before stroke, mean of BP at admission and morning after	412/511 (80.6%)	15.09 (7.01 - 32.45)	<0.0001
Self-reported history of Hypertension, or use of antihypertensive medications before stroke, mean of BP at admission	416/511 (81.4%)	21.48 (9.00 – 51.29)	<0.0001
Self-reported history of Hypertension, or use of antihypertensive medications before stroke, mean of BP after admission	396/509 (77.8%)	10.42 (5.32 – 20.42)	<0.0001
Self-reported history of Hypertension, or use of antihypertensive medications before or after stroke, mean of BP at admission	457/511 (89.4%)	39.39 (13.84 – 112.12)	<0.0001

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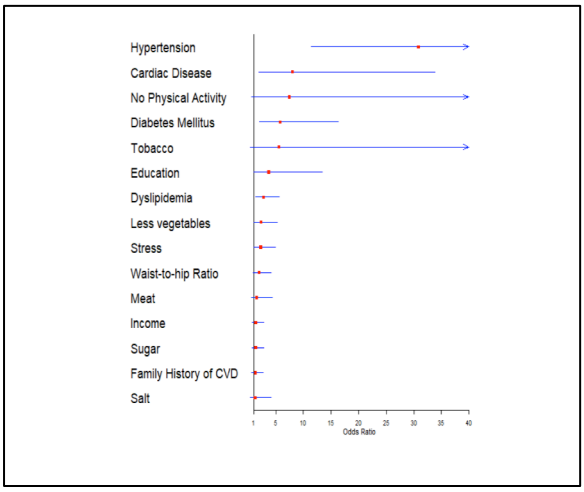

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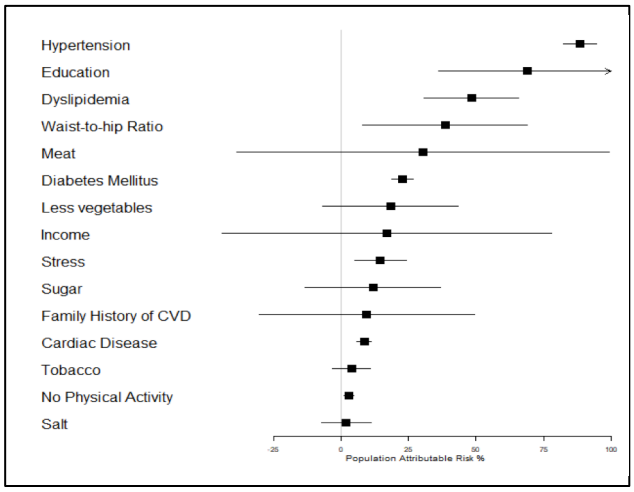

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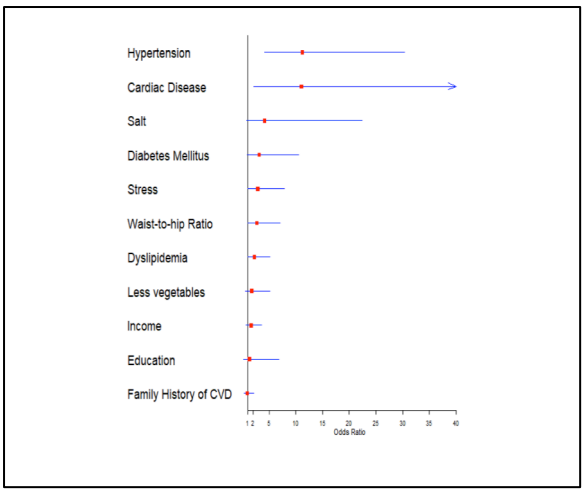

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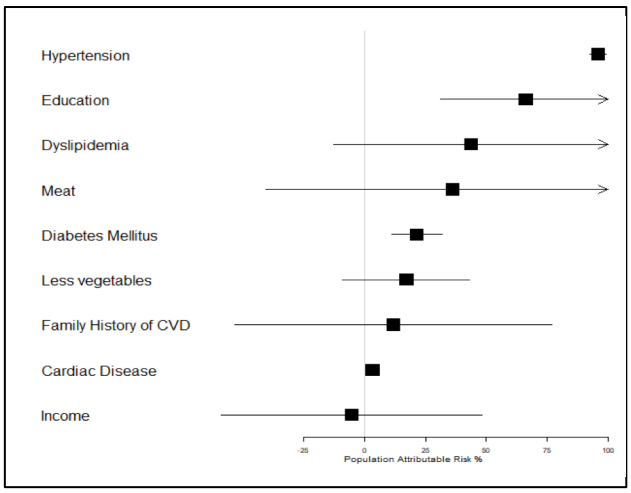

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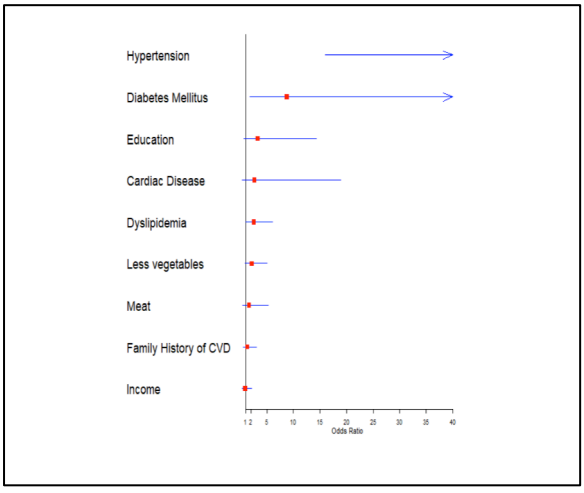

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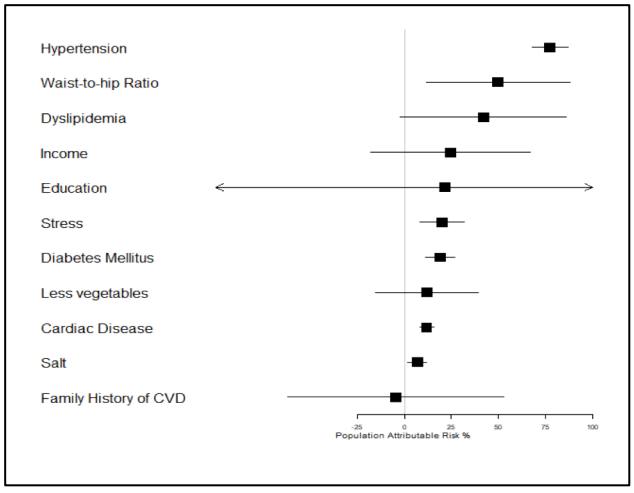

Supplementary Figure I: Risk Factors for stroke among young West Africans. Risk factors are depicted as Forest Plots showing Odds Ratio (OR) (Figure SIA) and Population Attributable Risk (PAR) (Figure SIB) for stroke overall; Figure IC depicts ORs for Ischemic stroke and ID shows PARs of risk factors for hemorrhagic stroke and Figure IE and IF shows ORs and PARs of risk factors for hemorrhagic stroke among West Africans <50years old.

APPENDIX: RISK FACTOR DEFINITIONS AND MEASUREMENTS

Hypertension: We measured blood pressure using a standard sphygmomanometer (Omron or Accoson England mercury sphygmomanometer). Systolic blood pressure was determined by Korotkoff phase 1 while diastolic pressure was recorded at Korotkoff phase V. Subject was resting for ≥5 minutes, and had not smoked for at least 30 minutes before the measurement. We ensured an adequate cuff size with bladder encircling and covering 2/3 of length of arm with the bladder over the brachial artery and the lower border should be 1 inch (2-3cm) above the antecubital space. The bladder was deflated slowly and exact values to the nearest 2mmHg were recorded.

Blood pressure (average of three measurements used) was recorded at time of admission (from patient's medical notes), the morning after admission (from patient's medical notes) and daily for 7 days or until death. At time of interview blood pressure was again measured by research personnel using an automated blood pressure monitor. A cutoff of ≥140/ 90 mmHg for up to 72 hours after stroke, a history of hypertension, or use of antihypertensive drugs before stroke or >72 hours after stroke were regarded as indicators of hypertension. Adjustments to systolic BP based on reported associations between pre-morbid BP and acute post-stroke pressure in the Oxford Vascular Study (OXVASC)[1] were applied. Definition of hypertension in controls was self-reported history of hypertension or BP at time of interview ≥140/90mmHg.

In our primary analysis, we used the average of three blood pressure readings taken at admission, day 1 after admission and at interview. Typically stroke subjects present for care late after about 72 hours of stroke onset during which time the acute rise in blood pressure in response to stroke may have started to subside. In sensitivity analysis, we applied an adjustment factor of 0.8755 to systolic blood pressure for hemorrhagic stroke at presentation, day 1 and time of interview and a factor of 0.9358 to systolic blood pressure for ischemic stroke at presentation, day 1 and time of interview.[8] Hence we calculated the adjusted odds ratio using the mean of three blood pressure measurements (at time of admission, morning after admission and time of interview) as primary analysis and compared with an approach using adjusted blood pressure at time of interview or introduction of new antihypertensive therapy after stroke (see Supplementary table II)

Weight: The scales were standardized to 0 before each use. Weight was measured in undergarments using a platform scale to the nearest 0.2kg. We recorded the participant's weight twice in kilogram (kg).

Height: We recorded the participant's height in meters (cm). If the participant was able to stand, standing height was measured with the subject bare footed, back square against the bed and eyes looking straight ahead. Supine height was measured with the subject in bare feet, lying on their back square against the bed and eyes looking straight upward. Height was measured to the nearest 0.5cm.

Body Mass Index (BMI): This was calculated by dividing weight (in kg) by square of the height (in meters).

Waist and hip circumferences were measured in the standing and supine positions in cases and controls. Where cases were unable to stand due to disability, these

measurements were conducted in the supine position only. Standing waist and hip measurements were used in the present analysis where available. However for cases with only supine estimates, we used the supine measures in the matched control.

Waist circumference: This was measured to the nearest 0.1cm using a non-stretchable standard tape measure attached to a spring balance exerting a force of 750gm over the unclothed abdomen at the midway between the costal margin and the iliac crest. The tape measure was kept horizontal for standing measurement and vertical for supine measurement with the subject relaxed with arms held loosely at sides.
Hip circumference: This was measured to the nearest 0.1cm using a non-stretchable standard tape measure attached to a spring balance exerting a force of 750gm. Measurements were taken over light clothing at the level of the greater trochanters (usually the widest diameter around the buttocks). The tape measure was kept horizontal for standing measurement and vertical for supine measurements.
For waist-to-hip ratio (WHR) and body mass index (BMI), tertiles by sex were calculated based on the overall control data or by using WHO cut-offs[2].

For **psychosocial factors**, we used a combined measure of psychosocial stress employed in INTERHEART[3] and INTERSTROKE[4], which combined self report of stress at home or and work, life events and depression. Psychosocial stress at home/work was defined as the experience, in the two weeks prior to the stroke, of irritability, anxiety, or sleep difficulties as a result of conditions at work or home. For life events, respondents were asked to give a 'yes' or 'no' response to questions about whether, in the two weeks before the stroke, they experienced a stressful life event such as the death of a spouse, death/major illness of a close family member, marital separation/divorce, major personal injury or illness, loss of crop, loss of job/retirement, business failure, major intra-family conflict, violence (including kidnapping, assault, theft, etc.), financial stress, home-related stress, work-related stress, or other major stress.
For the assessment of depression, respondents were first screened for the presence of depressed mood in the four weeks before the stroke. Those who answered in the affirmative were next asked if, for at least two weeks during the four- week period before the stroke, they also experienced at least four out of seven other depression symptoms: loss of interest, feeling tired or low on energy, significant changes in weight, trouble falling asleep as usual, difficulty concentrating, thoughts of death, or feelings of worthlessness.

Dietary History: We evaluated whether or not subjects consumed cooking oil, vegetable intake, sprinkling salt at table, meat consumption, fruits, whole grains, refined grains, dairy products, poultry, eggs, fish and seafood, legumes, prickled food, deep fried foods, salty snacks, confectionary and carbonated beverages. For each of the food items, subjects had to record the number of times it was consumed per month or per week or per day. Regular consumption of a food item was defined as intake of at least once a day, a week, or a month whilst consumption rates less than once a month or never was defined as 'not regular'.

Determination of blood glucose level, HBA1c and lipid profile:
Blood samples were collected from each case within 10 days of symptom onset, and from each control upon enrollment after an overnight fast and into relevant

anticoagulant bottles tubes. All blood samples collected were centrifuged at 3000rpm for 20 minutes (2,500rpm for samples in Sodium citrate tubes) and separated into relevant fractions [serum, plasma, buffy coat and red cell concentrates] within 2 hours of collection. Fractions were stored at -20^{o}C in non-self defrosting freezers at peripheral sites before transfer to central biorepository. A daily temperature chart was kept on every freezer to monitor the freezer temperature in order to maintain the samples' integrity

Spot determination of plasma glucose level was carried out across all study sites using the ACCU-CHEK Active Blood Glucose Monitoring Device (Roche Diagnostics, GmBH, Germany), the principle of which was based on the reaction of blood glucose with glucose dehydrogenase enzyme resulting in colour changes which the meter converted to numerical values. Values obtained in mg/dl were converted to mmol/L[5].

Glycated haemoglobin (HbA1c) level was also determined on whole blood from all subjects within 24 hours of sample collection using the Clover A1c Test Catridge System (Infopia Co. Ltd., Korea). The Clover A1c system uses the principle of boronate affinity chromatographic method for the determination of HbA1c in whole blood.[6] Reagents in the system lyse red cells and bind haemoglobin, also the boronate resins bind the cis-doils of glycated haemoglobin. These are measured separately within the system and the ratio of glycated haemoglobin to total haemoglobin were expressed as percentage.

Fasting lipid profile of subjects was determined by quantitative determination of cholesterol, triglycerides, HDL cholesterol using commercially available kits (Randox Laboratories Ltd., UK; Biolabo S.A., France) and the LDL cholesterol was calculated using Friedwald equation.[7] Cholesterol and Triglycerides were determined using the enzymatic hydrolysis/colorimetric method while HDL-cholesterol was determined by precipitation method and the cholesterol fraction measured as previously described.[8-10] Values obtained in mg/dl were converted to mmol/L.[11]

To ensure equivalence across all sites, a standard operating procedure (SOP) was developed on the above laboratory tests and applied across all SIREN sites after a 3-day hands-on-training involving laboratory scientists from across all sites. Refresher trainings were also organized every year. The same brand of test equipment, reagents and test strips were procured and utilized across study sites.

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